

REMARKS

This Preliminary Amendment is made to place the subject application in better form for examination in the U.S. Patent and Trademark Office. The claims have been amended to correct multiple dependency and antecedent basis issues that may arise under US practice. No new matter is presented.


Claim 15 has been canceled and new claims 16-23 are added. The number of independent claims remains within the number permitted under the basic filing fee. The total number of claims exceeds the basic number permitted by two. The attached transmittal letter contains a charge authorization for the fee for two added claims.

No new matter is presented.

Applicant requests entry of this preliminary amendment and examination in due course.

Respectfully submitted,

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VERSION SHOWING CHANGES

1(amdnd). A transmission component for producing normal and anomalous chromatic dispersion which can be predetermined, **comprising:** [having]

- [-] a glass fiber optical waveguide **structured** [in which it is possible] to carry not only **a** [the LP_{01}] fundamental mode but also at least one **other** [LP_{mn}] mode, and
- [-] two pairs of Bragg gratings [(gratings 1 and 2, as well as 3 and 4)], of which at least one pair has chirped Bragg gratings,

in which **a** [the] first Bragg grating in each **said** pair reflects **an** [the] arriving light beam back to **an** [the] other Bragg grating **in said pair**, in a direction approximately opposite **a forward** the incidence direction **of incidence of the light beam**, and from which other Bragg grating the light beam emerges [in, or at least parallel to, the original incidence] **substantially along the** direction **of incidence**.

2(amdnd). The transmission component as claimed in claim 1, **wherein** [characterized in that] the Bragg gratings are contradirectionally mode-coupling fiber Bragg gratings, [which are produced in particular in the] **provided in a** glass fiber optical waveguide.

3(amdnd). The transmission component as claimed in claim 1 [or 2], **wherein** [characterized in that] all the Bragg gratings are chirped.

4(amdnd). The transmission component as claimed in **claim 3** [one of claims 1 to 3], **wherein** [characterized in that] the two gratings in each **said** pair have different grating constant ranges and opposite chirp.

5(amdnd). The transmission component as claimed in **claim 1** [one of claims 1 to 4], **wherein the two pairs of Bragg gratings are arranged in order as a first through a fourth grating, wherein** [characterized in that,] in **an operational** [the] wavelength band [that is to be used], the second grating [(2)] in the first pair first [of all] mode-couples the [LP_{01}] fundamental **mode** [mode-I], which is fed in on **an** [the] input side, contradirectionally into an intermediate mode [(mode-II)],

wherein ~~[in that]~~ the first grating ~~[(1)]~~ mode-couples the intermediate mode contradiirectionally, that is to say in the forward direction once again, into a third mode ~~[mode III]~~,

wherein ~~[in that]~~ the fourth grating ~~[(4)]~~ mode-couples the third mode contradiirectionally into the intermediate mode ~~[(mode II)]~~ once again, and

wherein ~~[in that]~~ the third grating ~~[(3)]~~ mode-couples the intermediate mode contradiirectionally, that is to say once again in the forward direction, into the $[LP_{01}]$ fundamental **mode** ~~[(mode I)]~~ which, after passing through the fourth grating ~~[(4)]~~, emerges on **an** ~~[the]~~ output side with dispersion applied to it by virtue of ~~[the]~~ chirp of the **chirped** gratings ~~[(1 to 4)]~~.

6(amended). The transmission component as claimed in **claim 1** ~~[one of claims 1 to 5]~~, **wherein** ~~[characterized in that]~~ a parabolic refractive index profile is provided in **a** ~~[the]~~ core of the glass fiber **optical waveguide**, in order to produce the Bragg gratings.

7(amended). The transmission component as claimed in claim 6, **wherein** ~~[characterized in that]~~ the glass fiber **optical waveguide** is doped with **at least one of** GeO_2 , F- and ~~[or]~~ Be_2O_3 in order to produce the refractive index profile.

8(amended). The transmission component as claimed in **claim 1** ~~[one of claims 1 to 7]~~, **wherein** ~~[characterized in that]~~ the glass fibers have approximately the same mode field radius as the fibers that are to be connected.

9(amended). The transmission component as claimed in **claim 1** ~~[one of claims 1 to 8]~~, **wherein** ~~[characterized in that]~~ LP_{01} , LP_{02} , and LP_{03} ~~are used as the]~~ rotationally symmetrical modes LP_{01} , LP_{02} , and LP_{03} ~~[that]~~ are carried **by the component**.

10(amended). The transmission component as claimed in **claim 9** ~~[one of claims 1 to 9]~~, **wherein** ~~[characterized in that]~~ non-rotationally symmetrically carried modes ~~[, namely the LP_{11} mode,]~~ are also **carried by the component, and wherein** ~~[used, with]~~ the Bragg gratings **are arranged** ~~[not being produced at right angles, but]~~

obliquely rather than at right angles with respect to a [the] fiber axis of [in] the glass fiber optical waveguide.

11(amended). The transmission component as claimed in claim 1 ~~one of claims 1 to 10~~, wherein ~~[characterized in that]~~ a cladding mode is also used in addition to two modes which are carried by the glass fiber optical waveguide.

12(amended). The transmission component as claimed in claim 1 ~~one of claims 1 to 11~~, wherein ~~[characterized in that]~~ the gratings ~~[(1 to 4)]~~ are chirped linearly for first-order dispersion compensation ~~[, or are chirped non-linearly for higher-order dispersion compensation of one or more of the gratings (1 to 4)]~~.

13(amended). The transmission component as claimed in claim 1 ~~one of claims 1 to 12~~, further comprising means for applying to the glass fiber optical waveguide at least one of ~~[characterized in that, in order to precisely set the propagation time difference between the extreme values for the wavelengths that are used,]~~ defined mechanical forces ~~[are applied to the fiber, and/or the temperature of the fiber is thermally stabilized]~~ and temperature stabilization at a suitable value within a specific temperature range, in order to set a propagation time difference between extreme values for wavelengths that are used.

14(amended). A transmission component as claimed in claim 1, wherein at least two said components are ~~[having increased chromatic dispersion, characterized in that a number of the elements as claimed in claim 1 one of claims 1 to 13 are connected in series]~~.

15.(cancel). ~~Use of a transmission component as claimed in one of claims 1 to 14 in order to compensate for the dispersion in glass fiber paths.~~

The following claims are added

-- 16(n w). The transmission component as claimed in claim 1, wherein the light beam merges in a direction that is on of in the direction of incidence, and substantially parallel to the direction of incidence.

17(new). The transmission component as claimed in claim 2, characterized in that all the Bragg gratings are chirped.

18(new). The transmission component as claimed in claim 2, characterized in that the two gratings in each pair have different grating constant ranges and opposite chirp.

19(new). The transmission component as claimed in claim 3, characterized in that the two gratings in each pair have different grating constant ranges and opposite chirp.

20(new). The transmission component as claimed in claim 1, wherein the gratings are chirped non-linearly for high-order dispersion compensation of one or more of the gratings.

21(new). A method for producing normal and anomalous chromatic dispersion which can be predetermined, comprising:

applying an incident light beam in a forward direction onto a glass fiber optical waveguide structured to carry not only a fundamental mode but also at least one other mode, and at least two pairs of Bragg gratings, of which at least one pair has chirped Bragg gratings, and,

causing a first Bragg grating in each said pair to reflect an arriving light beam back to an other Bragg grating in said pair, in a direction approximately opposite the forward direction, and from which other Bragg grating the light beam emerges substantially along the direction of incidence.

22(new). The method as claimed in claim 21, comprising providing two said gratings in each said pair with different grating constant ranges and opposite chirp.

23(new). The method as claimed in claim 21, comprising arranging the two pairs of Bragg gratings in order as a first through a fourth grating, wherein in an operational wavelength band, the second grating in the first pair first mode-couples the fundamental mode, which is fed in on an input side, contradirectionally into an intermediate mode,

wherein the first grating mode-couples the intermediate mode contradirectionally, that is to say in the forward direction once again, into a third mode,

wherein the fourth grating mode-couples the third mode contradirectionally into the intermediate mode once again, and

wherein the third grating mode-couples the intermediate mode contradirectionally, that is to say once again in the forward direction, into the fundamental mode which, after passing through the fourth grating, emerges on an output side with dispersion applied to it by virtue of chirp of the chirped gratings.